

VAST-2 - Site-based recording of use and land management and their effects on native vegetation over time

Citation: Thackway, R (2012). Wooroonooran Nature Refuge, Redlynch, Queensland. Ver.1. VAST-2: tracking vegetation transformation in Australian landscapes. Australian Centre for Ecological Analysis and Synthesis, University of Queensland, Brisbane.

1. Name of the site/area

Wooroonooran Nature Refuge, Redlynch, Qld.

2. Last modified (version no. 1)

Minor changes July 2013

3. Location of site

State: Queensland

IBRAv7 Classification:

REG_NAME_7:	REG_CODE_7:	SUB_NAME_7:	SUB_CODE_7:
Wet Tropics	WET	Atherton	WET04

Co-ordinates: 17°23'15.44"S 145°43'33.83"E

Spatial precision re Attachment 1: Code = 1

4. Area of the site

30.8 ha

5. Brief description of the natural undisturbed ecosystem of the site/area

Complex mesophyll vine forest on basaltic red loams on wet uplands, altitude 720 metres with 4.421 mm rainfall (avg. annual recorded between 1993-2011)
Source: Peter Stanton.

Regional ecosystem - Complex mesophyll vine forest 7.8.2

Rainforests reach their peak development as complex mesophyll vine forests on the very wet and wet lowlands and foothills on soils which include basalts, basic volcanics, mixed colluvia and riverine alluvia. These communities have an uneven canopy ranging from 20 to 40 metres (65 to 130 feet) in height. There is a lot of stratification and many of the tallest trees that stand prominently higher than the top of the continuous canopy (called emergents) have large spreading crowns. Species composition and the variety of life forms are the most complex of any vegetation type found on the continent. Plank buttressing is common, robust woody lianes, vascular epiphytes and palms are typical, and fleshy herbs with wide leaves (such as gingers and aroids) are prominent. When comparing complex mesophyll vine forest communities, there are obvious structural differences such as an increase in palms on sites with poor drainage, and gingers and aroids in gullies and along creek banks which are permanently saturated with water.



COMPILER: Richard Thackway.

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Source: http://www.wettropics.gov.au/pa/pa_forest_types.html

6. Current purpose (2011) of the site/area

Site formally gazetted as Wooroonooran Nature Refuge by Wet Tropics Management Authority. Site adjacent to Bartle Frere National Park. Nature Refuge Lots 1 and 2.

7. Reference or benchmark vegetation description: pre clearing or pre European community

Area of the plot = n/a

8. Brief history of the site/area

1800	Indigenous management of Mesophyll rainforest by Ngadyan people
1924	Start of selective logging of high value timber species
1930	Finish of selective logging of high value timber species – intent to convert rainforest to pasture
1931	Start of land clearing of the previously logged forest – intent to convert rainforest to pasture
1938	End of land clearing of the previously logged forest - forest trash burnt
1939	Start of intensive soil and pasture management - soil not ploughed – aggressive pasture grasses sown into ash bed
1940	Start of grazing- pasture for dairying
1958	End of grazing planted pasture for dairying. Pastures infertile. All livestock removed
1959	Start of land abandonment and minimal use
1983	Commenced large scale spraying and poisoning and physical removal of Lantana
1993	Regrowth rainforest (complex mesophyll vine forest) in gullies and on lower slopes - 50% of Lot 2
1994	Continued large scale spraying and poisoning of Lantana and carpet grass.
2003	Site formally gazetted as Wooroonooran Nature Refuge by WTMA
2011	Site continues to be manage for multiple values: timber reserve, biodiversity and habitat values



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9. Proximity to large area of intact and largely intact and unmodified remnant

n/a

10. Sources of data and information used to complete table below

- A. Peter & Karen Stanton pers. comm. 2011
- B. Survey Plan 1924
- C. Aerial photos 1943
- D. K.J. Frawley (1983) Forest and land management in north-east Queensland 1859-1960. PhD Thesis ANU.
- E. Property owner before Peter & Karen Stanton
- F. Nature refuge brings benefits for environment <http://ginfo.pl/more/369511,Nature+refuge+brings+benefits+for+environment.html>
- G. Inferred by Richard Thackway
- H. Aerial photos 2000
- I. Wet tropics Management Authority mapping 2005
- J. <http://www.griffith.edu.au/cgi-bin/frameit?http://www.griffith.edu.au/ins/collections/webb/landuse.html>
- K. Gilmore, M. A. (2005) Kill, cure or strangle: the history of government intervention in three key agricultural industries on the Atherton Tablelands, 1895 – 2005. PhD Thesis JCU
- L. 1960 aerial photos
- M. 2006 aerial photos
- N. Melanda 1:50,000 vegetation map http://www.wetropics.gov.au/map/map_vegetationmaps.html Malanda 8063-3[1].pdf January 2009, series WTMAveg, sheet 8063-3, edition 1
- O. Kanowski J., Kooyman R. and Catterall C.P. (2009) Chapter 14 Dynamics and Restoration of Australian Tropical and Subtropical Rainforests <http://www.rrrc.org.au/publications/downloads/495-GU-Kanowski-J-et-al-2009-Dynamics-and-Restoration.pdf>



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Description of use and management and their effects on native vegetation over time (explanation of numbered codes in Attachment 1)

Approx. Year	Source year	Reliability year	Land use	Land Management practice (LMP)	Source LMP	Reliability LMP	Observed effects and consequences on ecological function and native vegetation structure, composition and regeneration	Source Effects	Reliability Effects
1800	G	4	Managed resource protection 1.2.0	Indigenous management of Mesophyll rainforest – Ngadyan people	K	7	Regenerative capacity unmodified. Soil minerals held in the litter and A horizon under 4421 mm rainfall	A	7
1885	K	4	Managed resource protection 1.2.0	Aboriginal population was in such a state of poverty and illness. The traditional use of the rainforest and its resources by the Ngadyan was destroyed	K	7			
1922	D	4	Managed resource protection 1.2.0	Boonjie area proposed to be opened up. Issue was settlement was disguised as a solution for timber exploitation	D	7			
1924	B	4	Managed resource protection 1.2.0				Unmodified complex mesophyll vine forest	B	7
1924	A	4	Production forestry 2.2.0	Start of selective logging of high value timber species bullocks were used to snig timber to loading ramps. Bullocks pulled logs onto trucks	A	7	Minimal impact of bullocks on soil Log dumps resulted in soil compaction - <1% Reduced canopy by 10-15% harvested Queensland maple, northern silky oak, maple Silkwood No effect on height.	A	7
1930	A	4	Production forestry 2.2.0	Finish of selective logging of high value timber species	A	7	Rainforest left intact in creeks and gullies	A	7
1931	G	4	Land in transition - Treed 2.3.0	Start of land clearing of the previously logged forest- Clearing done with brush hooks to clear the dense undergrowth. Small trees were cut down with an axe and large trees were cut down using a cross-cut saw. Brush and fallen timber was burnt. See logging description sent my home address Clearing and veg was burnt in Nov/Dec.	A	7	100% removal of understorey Ringbarked and left standing Touriga left standing and used later as fence posts Degraded rainforest left in creeks and gullies	A	7



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1938	A	4	Land in transition - Treed 2.3.0	End of land clearing of the previously logged forest	A	7	Degraded rainforest left in creeks and gullies	A	7
1939	A	4	Grazing modified pastures 3.2.0	Soil not ploughed. Seed spread by hand into the ashes. Logs still present and stumps standing.	A	7	Spp composition reduced to 0% Structure was 0% Regen potential – 100% Grass growth very vigorous. Grass prevented regrowth. Degraded rainforest left in creeks and gullies	A	7
1939	A	4	Grazing modified pastures 3.2.0	Molasses grass and paspalum as pasture for dairy cattle	A	7	Degraded rainforest left in creeks and gullies	A	7
1939	A	4	Grazing modified pastures 3.2.0	Start of dairying	A	7	As the vigor of the grass was high porous – the soil structure not a problem. Degraded rainforest left in creeks and gullies unchecked	A	7
1940	G	4	Grazing modified pastures 3.2.0	Once the land was cleared commenced dairying. Brushing and grubbing out the weeds Axe brush hook and spraying Poisoned weeds with Arsenic.	K	7	Rotting vegetation rapidly disappeared, and with it, much of the soil fertility. The cleared ground was subject to infestations of opportunistic weeds such as inkweed, milkweed, wild tobacco and stinking roger, none of which provided pasture suitable for dairy stock.	K	7
1940	G	4	Grazing modified pastures 3.2.0	Pastures ran down quickly from time of clearing. Degraded rainforest left in creeks and gullies unchecked	E	7	Nutrients eroded off the surface and leached below the root zone. Soil became very acidic i.e. pH 4.5-5 leading to manganese and aluminium toxicity in some areas	A	7
1940	C	4	Grazing modified pastures 3.2.0	Ground photo shows stumps and logs burnt. With pasture swards	A	7	Severe gully erosion and creek bank erosion. No fertiliser was used. Degraded rainforest left in creeks and gullies unchecked	A	7
1941	G	4	Grazing modified pastures 3.2.0	Carpet grass invaded because of lack of fertility Lime started to be used	A	7	Regrowth rainforest started on the creeks where cattle could not graze	A	7



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1943	C	4	Grazing modified pastures 3.2.0	Carpet grass continued to invade because of lack of fertility Continued to use lime	A	7	Soil pH 4.5 – 5.5 Land completely cleared of trees with a grassy cover of carpet grass Regrowth rainforest allowed to establish in creeks and gullies unchecked	A	7
1947	A	4	Grazing modified pastures 3.2.0	Maintain pastures only by regular huge dressings of lime	E	7	Degraded rainforest left in creeks and gullies unchecked 1947 Regrowth estimations: Number of species overstorey = 8 spp, regrowth number of species overstorey 3 spp (i.e. 1 tree & shrubs + 2 ferns, bryophytes, epiphytes, climbers & mosses). 1947 regrowth projective foliage cover overstorey = 60%, understorey 2 %. 1947 regrowth average top height overstorey = 8m, understorey 1 m	A	7
1958	A	4	Grazing modified pastures 3.2.0	End of dairying because the pastures were infertile All livestock removed	A	7	Advanced regrowth would have started on the creeks. 100% cover in these zones. 1955 Regrowth estimations: Number of species overstorey = 10 spp, regrowth number of species overstorey 30 spp (i.e. 20 tree & shrubs + 10 ferns, bryophytes, epiphytes, climbers & mosses). 1955 regrowth projective foliage cover overstorey = 100%, understorey 5 %. 1955 regrowth average top height overstorey = 15m, understorey 2 m	A	7
1959	A	4	Agricultural land in transition 3.6.0	Land not used (abandoned). Regrowth left unchecked	A	7	Lantana and rainforest occupy deeper gullies and creek lines. Trees in creek lines observed as lines on aerial photos Wattles were a major component Acacia celsa of regrowth. Tree ferns as well.	A	7



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1960	G	4	Agricultural land in transition 3.6.0			7	secondary forest may not progress toward the condition of intact rainforest for other reasons, including dominance of the seed rain by exotic plants, elevated rates of seed predation or herbivory, changes in underlying soil and/or hydrological conditions from past land uses and repeated disturbance (various citations in 'O').	O	7
1960	A	4	Agricultural land in transition 3.6.0	Intensive agricultural pursuits in rainforest landscapes have frequently been abandoned because of declining productivity or changes in economic conditions Regrowth left unchecked	O	7	... abandoned agricultural land protected from fire and other major disturbances, secondary forest will often eventually replace the grassland. ... redevelopment of rainforest following the abandonment of agriculture may be constrained by the destruction of the rainforest seed and seedling banks, the limited dispersal of seeds from remnant forests, predation on dispersed seeds, a reduction in soil fertility, competition from exotic plants, and repeated disturbance from fire and grazing	O	7
1960	L	4	Agricultural land in transition 3.6.0	Land not used	A	7	Numerous small patches of trees spread through the grassland – Alphitonia excelsa - Sarsaparilla Tree. 30 yrs of age. Coloniser plus around 3 other species. Cover crop for other species. Seed in the soil germinating 40 yrs after clearing. Regrowth left unchecked	L	7

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1972	A	4	Other minimal use 1.3.0	Land purchased by Clyde and Pat Cook – purchased as 2 80 ac blocks. Mining lease. Regrowth left unchecked.		7	1970 Regrowth estimations: Number of species overstorey = 10 spp, regrowth number of species overstorey 40 spp (i.e. 20 tree & shrubs + 20 ferns, bryophytes, epiphytes, climbers & mosses). 1970 regrowth projective foliage cover overstorey = 100%, understorey 25 %. 1970 regrowth average top height overstorey = 20m, understorey 4 m	A	7
1973	A	4	Other minimal use 1.3.0	Planted <i>Pinus caribaea</i> and hoop 5 ha Regrowth left unchecked.	A	7	20 -30 yr regrowth pH almost same as primary forest. Soil very well drained. Soil structure not a problem. Cover was closed in the creek lines. Dense cover was spreading across the property Regrowth left unchecked	A	7
1977	A	4	Other minimal use 1.3.0	Land not in use	A	7	Where pasture grasses had been limed and left for 10 years a dense cover of weeds and regrowth spread right across property occupying 50% area Site became invaded by woody weeds and a limited set of volunteer rainforest species. Minerals began to accumulate in the litter and A horizon under 2000 mm rainfall. Regrowth left unchecked	A	7
1983	G	4	Other minimal use 1.3.0	Commenced spraying and poisoning Lantana	A	7	Woody weeds gave way to a greater number of volunteer rainforest species creating a secondary succession complex. Regrowth left unchecked	A	7



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1992	A	4	Other minimal use 1.3.0	Large areas were bull dozed to remove lantana	A	7	Map C – Most gullies show closed forest (regrowth rainforest) Areas bull dozed were infested with Lantana. Regrowth left unchecked. 1990 Regrowth estimations: Number of species overstorey = 11 spp, regrowth number of species overstorey 60 spp (i.e. 20 tree & shrubs + 40 ferns, bryophytes, epiphytes, climbers & mosses). regrowth projective foliage cover overstorey = 100%, understorey 20 %. 1990 regrowth average top height overstorey = 22m, understorey 2-15 m average 8.5 m	A	7
1993	A	4	Other minimal use 1.3.0	Peter and Karen purchased Lot 2 Regrowth left unchecked.	A	7	Creek line was already well restored in the gullies to regrowth rainforest. Small trees and ferns present More than half Lot 2 was regrowth.	A	7
1993	A	4	Other minimal use 1.3.0	Commenced clearing large areas of Lantana and carpet grass. Weeds sprayed with glyphosate. Priority was grass followed by Lantana. Larger stems cut with axe or ringbarked and stumps poisoned. Sprayed lantana and raspberry and Carpet grass	A	7	The transition to secondary forest can occur rapidly if land is abandoned shortly after clearing and subsequently protected from disturbance. Rainforest plants may regenerate from residual rootstocks and the seed bank, supplemented by dispersal from nearby forests	O	7
1994	G	4	Other minimal use 1.3.0	Commenced planting 813plantation seedlings /ha i.e. 1000-4000 per annum on hills and lower slopes. Regrowth left unchecked.	A	7	For every 813 plantation seedlings planted, 1100 plants volunteered in the regrowth rainforest	A	7
1995	A	4	Other minimal use 1.3.0	Continued planting 813plantation seedlings /ha i.e. 1000-4000 per annum on hills and lower slopes. Regrowth left unchecked.	A	7	Patches of acid soil were growing carpet grass ~ 3ha. Areas which grew lantana the trees grew 50% faster because of more fertile soil.	A	7



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1998	A	4	Other minimal use 1.3.0	Planted with Araucaria cunninghamii - Hoop Pine. Added dolomite. Continued with weed removal – axe ringbarking and stumps poisoned. Sprayed lantana, raspberry and carpet grass as required. Regrowth left unchecked.	A	7	Large infestations of weeds no longer present Shrub cover observed. Rhodomytus shrub. Around 50%. Other things started to grow better once shrub established.	A	7
2000	A	4	Other minimal use 1.3.0	Continued with weed removal – axe ringbarking and stumps poisoned. Sprayed lantana, raspberry and carpet grass as required	A	7	30.8 ha mapped as regrowth rainforest 100% cover Height would be ~20m Emergent ~25-30 m - Elaeocarpus grandis, Blue Quandong.	A, N	7
2003	F	4	Managed resource protection 1.2.0	Wooroonooran Nature Refuge gazetted as a voluntary conservation agreement. Timber management zone - harvesting sustainably Protection of habitat supporting southern cassowary and Herbert River ringtail possum.	F	7			
2006	A	4	Managed resource protection 1.2.0	Finished planting seedlings 813 stems / ha seedlings planted as plantation Since 1995 a total of 23,000 seedlings have been planted Volunteers were removed to enhance the preferred species. Continued with weed removal – axe ringbarking and stumps poisoned. Sprayed lantana, raspberry and carpet grass as required	A	7	1100 stems / ha in the canopy volunteers	A	7
2007	A	4	Managed resource protection 1.2.0	Continued with weed removal – axe ringbarking and stumps poisoned. Sprayed lantana, raspberry and carpet grass as required	A	7			



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2009	A	4	Nature conservation 1.1.0	Continued with weed removal – axe ringbarking and stumps poisoned. Sprayed lantana, raspberry and carpet grass as required	A	7			
2010	A	4	Managed resource protection 1.2.0	Continued with weed removal – axe ringbarking and stumps poisoned. Sprayed lantana, raspberry and carpet grass as required	A	7	Canopy cover is 100% over 30.8% of property Regrowth left unchecked. 2010 Regrowth estimations: Number of species overstorey = 12 spp, regrowth number of species understorey 60 spp (i.e. 20 tree & shrubs + 40 ferns, bryophytes, epiphytes, climbers & mosses), Regrowth projective foliage cover overstorey = 100%, understorey 20 %. 2010 regrowth average top height overstorey = 23m, understorey 2-15 m average 8.5 m	A	7
2011	A	4	Managed resource protection 1.2.0	Continued with weed removal – axe ringbarking and stumps poisoned. Sprayed lantana, raspberry and carpet grass as required	A	7	Height would be ~20m – benchmark – 47 m height. Primary rainforest species are sitting in the lower understory in the shrub layer.	A	7



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Attachment 1

Reliability standards used to compile historic and contemporary site-based chronologies.

Reliability level standards	Spatial precision (Scale)	Temporal precision (Year of observation)	Attribute accuracy (Land use, land management practices, effects on condition)
HIGH "Definite"	Reliable direct quantitative data. Examples: Site, plot and transect based records. Code: 1	Reliable direct quantitative data. Examples: Day-month-year, season-year and year. Code: 4	Reliable direct quantitative data. Examples: Inventory and counts, recorded observations from field survey and monitoring, farm records Code: 7
MEDIUM "Probable"	Direct (with qualifications) or strong indirect data. Examples: Land unit and soil-landscape reports. Code: 2	Direct (with qualifications) or strong indirect data. Examples: Mid 1850s Code: 5	Direct (with qualifications) or strong indirect data. Examples: Reconnaissance surveys, medium and moderate resolution remote sensing, regional mapping Code: 8
LOW "Possible"	Limited qualitative and possibly contradictory observations. More data needed. Examples: Land system, sub-bioregion and bioregion reports. Code: 3	Limited qualitative and possibly contradictory observations. More data needed. Examples: Early 1800s and first half of 19 th century. Code: 6	Limited qualitative and possibly contradictory observations. More data needed. Examples: Generalised descriptions and narratives, census-based surveys Code: 9

